NASA MARSHALL SPACE FLIGHT CENTER HUNTSVILLE, ALA.

PROJECT MERCURY

The United States' first manned space flight program, Project Mercury, was accomplished in a period of 4-2/3 years. This period saw major government agencies and much of the aerospace industry combine skills, initiative, and experience in a successful national effort. During the program, six manned flights were made with complete pilot safety and without change to the basic Mercury concepts. The program showed that man could function ably as a pilot-engineer-experimentor without undesirable reactions and with no deterioration of normal body functions in the weightlessness of space — at least to 34 hours at a time.

Most important, Mercury set the stage for the longer-duration Gemini flights and the Apollo lunar landings.

The thought of flying through space has been in man's mind since the beginning of recorded history. It was not until the 1950's, however, that technology reached the point that ideas were transformed into hardware to achieve space flight. Specific government- and industry-conducted tests and studies culminated in the establishment of a national manned space flight project — later named Mercury — on October 7, 1958.

Project Mercury objectives as stated at the time of project approval were:

1. To place a manned spacecraft in orbit around the earth;
2. To investigate man's ability to function in space; and
3. To recover the man and the spacecraft safely.

The basic objectives were reached 3 years and 4 months after program authorization with John Glenn's three-orbit flight of February 20, 1962. Subsequently, Scott Carpenter completed a similar mission, then Wally Schirra and Gordon Cooper made flights of increased duration to gather added information on man's performance capabilities and functional characteristics in space.

In addition, increasing numbers of special experiments, observations, and evaluations performed during these missions provided scientific and technical communities with much new information.

Mercury history shows 25 major flight tests in a 45-month period. Launch preparations and flights were from two sites — Cape Canaveral in Florida and Wallops Island off the coast of Virginia. Twenty-three launch vehicles were used; these were seven Little Joe, six Mercury-Redstone, and ten Mercury-Atlas rockets. Two flight tests were off-the-pad aborts. Fifteen production capsules (the term **spacecraft** was not widely used until the maneuverable Gemini ship was flown) were used for unmanned and manned flight, some for more than one test, and one was used solely as a ground-test item.

At the height of Mercury activity, there were 11 major contractors, 75 major subcontractors, and 7,200 vendors working to produce the equipment needed in the effort. Also included in this endeavor were Department of Defense forces — ships, planes, medical assistance, and flight and recovery operations support.

Colleges and universities also investigated many different and significant facets of Project Mercury.

The total cost of the Mercury program was $392,100,000. Of that, $135.3 million was for spacecraft, $82.9 million for launch vehicles, $49.3 million for tracking equipment and operations, and $53.2 million for facilities.

MERCURY ASTRONAUTS are (Back row, l to r) Alan Shepard, Virgil Grissom, Gordon Cooper; (front row) Walter Schirra, Donald Slayton, John Glenn, and Scott Carpenter.

Mercury Flight Program Summary

Mission[a]	Spacecraft[b]	Launch date	Flight duration[c], hr:min:sec	Occupant	Basic test objectives[d]	Summary of results[e]
LJ–1	BP	Aug 21, 1959	00:00:20		Max. dynamic pressure abort; evaluate launch escape and recovery systems.	Object. not met; inadvertent abort initiated during countdown.
Big Joe	BP	Sep 9, 1959	00:13:00		Ballistic flight; evaluate heat-protection concept, aerodynamic shape, and recovery system.	Successful.
LJ–6	BP	Oct 4, 1959	00:05:10		Ballistic flight; qualify launch-vehicle structure; evaluate command system.	Successful.
LJ–1A	BP	Nov 4, 1959	00:08:11		Max. dynamic pressure abort; same as LJ–1.	Primary object. not met; escape motor ignition was late during reduced pressure region.
LJ–2	BP	Dec 4, 1959	00:11:06	Rhesus monkey	High-altitude abort; evaluate launch, abort, and reentry dynamics on S/C; recovery.	Successful.
LJ–1B	BP	Jan 21, 1960	00:08:35	Rhesus monkey	Max. dynamic pressure abort; same as LJ–1A; evaluate launch and abort.	Successful.
Beach abort	S/C 1	May 9, 1960	00:01:16		Off-the-pad abort; qualify structure and launch escape system for simulated pad abort.	Successful; expended rocket motor and tower not separated as quickly as expected.
MA–1	S/C 4	Jul 29, 1960	00:03:18		Ballistic flight; S/C-launch-vehicle compatibility; thermal loads in critical abort.	Object. not met; mission failed at about 60 sec after lift-off; S/C not recovered.
LJ–5	S/C 3	Nov 8, 1960	00:02:22		Max. dynamic pressure abort; qualify launch escape system and structure.	Object. not met; S/C did not separate from launch vehicle.
MR–1	S/C 2	Nov 21, 1960	00:00:00	Simulated man	Suborbital flight; qualify S/C-launch-vehicle compatibility, posigrades, ASCS.	Test object. not met; launch vehicle shutdown at lift-off; S/C landing system correctly deployed.
MR–1A	S/C 2	Dec 19, 1960	00:15:45	Simulated man	Suborbital flight; same as MR–	Successful; cutoff overspeed caused overshoot.
MR–2	S/C 5	Jan 31, 1961	00:16:39	Chimpanzee "Ham"	Suborbital flight; qualify ECS, landing bag.	Successful; launch vehicle failed to shutdown until fuel depletion, S/C overshot by 130 miles.
MA–2	S/C 6	Feb 21, 1961	00:17:56		Ballistic flight; same as MA–1	Successful.
LJ–5A	S/C 14	Mar 18, 1961	00:23:48		Max. dynamic pressure abort; same as LJ–5.	Object. not met; escape rocket ignited early; S/C recovered intact.
MR–BD	BP	Mar 24, 1961	00:08:23		Suborbital flight; evaluate modifications to correct MR–1 and MR–2 malfunctions	Successful.

MA–3	S/C	Apr 25, 1961	00:07:19	Simulated man	One-pass orbital flight; evaluate all S/C systems, network, recovery forces.	Object. not met; launch vehicle failed to follow roll program; S/C escape system operated.
LJ–5B	S/C 14A	Apr 28, 1961	00:05:25		Max. dynamic pressure abort; same as LJ–5 and LJ–5A.	Successful.
MR–3	S/C 7 "Freedom 7"	May 5, 1961	00:15:22	Alan B. Shepard	Suborbital flight; familiarize man with space flight; evaluate response and S/C control. Recovery Ship: USS Champlain (A)	Successful; first American astronaut in space.
MR–4	S/C 11 "Liberty Bell 7"	Jul 21, 1961	00:15:37	Virgil I. Grissom	Suborbital flight; same as MR–3 Recovery Ship: USS Randolph (A)	Successful; premature hatch release caused S/C to take on water and sink; astronaut recovered.
MA–4	S/C 8A	Sep 13, 1961	01:49:20	Simulated man	One-pass orbital flight; same as MA–3.	Successful; open circuit in control system caused S/C to land 75 miles uprange; S/C recovered.
MA–5	S/C 9	Nov 29, 1961	03:20:59	Chimpanzee "Enos"	Three-pass orbital flight; qualify all systems, network, for orbital flight recovery.	Successful; control system malfunction terminated flight after two passes.
MA–6	S/C 13 "Friendship 7"	Feb 20, 1962	04:55:23	John H. Glenn, Jr.	Three-pass orbital flight; evaluate effects on and performance of astronaut in space; astronaut's evaluation of S/C and support. Recovery Ship: USS Noa (A)	Successful; first American to orbit earth; control system malfunction required manual retrofire and reentry; erroneous T/M signal, retropack retained through reentry; S/C landed 40 miles uprange.
MA–7	S/C 18 "Aurora 7"	May 24, 1962	04:56:05	M. Scott Carpenter	Three-pass orbital flight; same as MA–6; evaluate S/C modifications and network. Recovery Ship: USS Pierce (A)	Successful; horizon scanner circuit malfunction required manual retrofire; yaw error caused S/C to land 250 miles downrange, recovery in 3 hr.
MA–8	S/C 16 "Sigma 7"	Oct 3, 1962	09:13:11	Walter M. Schirra, Jr.	Six-pass orbital flight; same as MA–6 and MA–7 except for extended duration. Recovery Ship: USS Kearsarge (P)	Successful; partially blocked ECS coolant valve delayed stabilizing suit temperature until 2nd pass; S/C landed 4-1/2 miles from primary recovery ship.
MA–9	S/C 20 "Faith 7"	May 15, 1963	34:19:49	L. Gordon Cooper, Jr.	Twenty-two pass orbital flight; evaluate effects on man of up to 1 day in space; verify man as primary S/C system. Recovery Ship: USS Kearsarge (P)	Successful; short circuit late in flight disabled ASCS, inverters, prompted manual retrofire and reentry; S/C landed 4-1/2 miles from ship.

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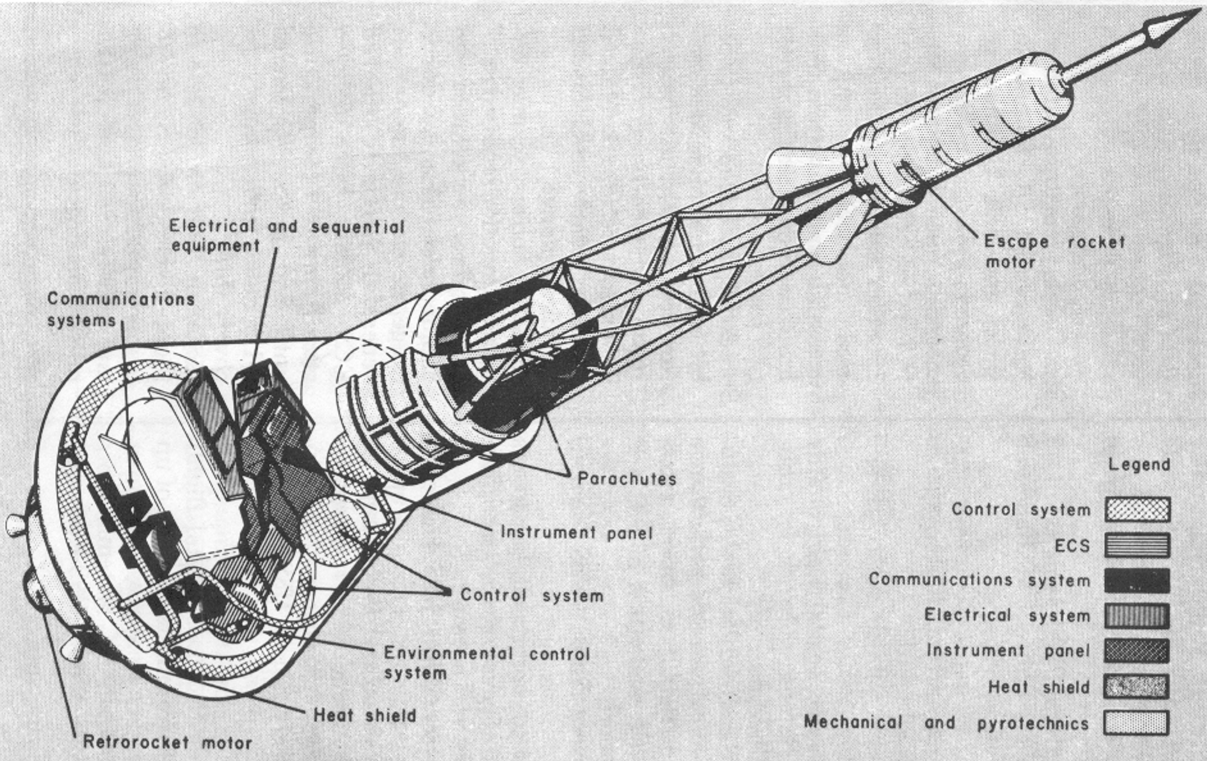
[a] LJ – Little Joe launch vehicle mission; MA – Mercury-Atlas (launch vehicle) mission; MR – Mercury-Redstone (launch vehicle) mission; BD – Booster development.

[b] BP – Boilerplate spacecraft; S/C 10, 12, 15, 17, 19 not used in flight program. (A) Atlantic Ocean splashdown (P) Pacific Ocean splashdown

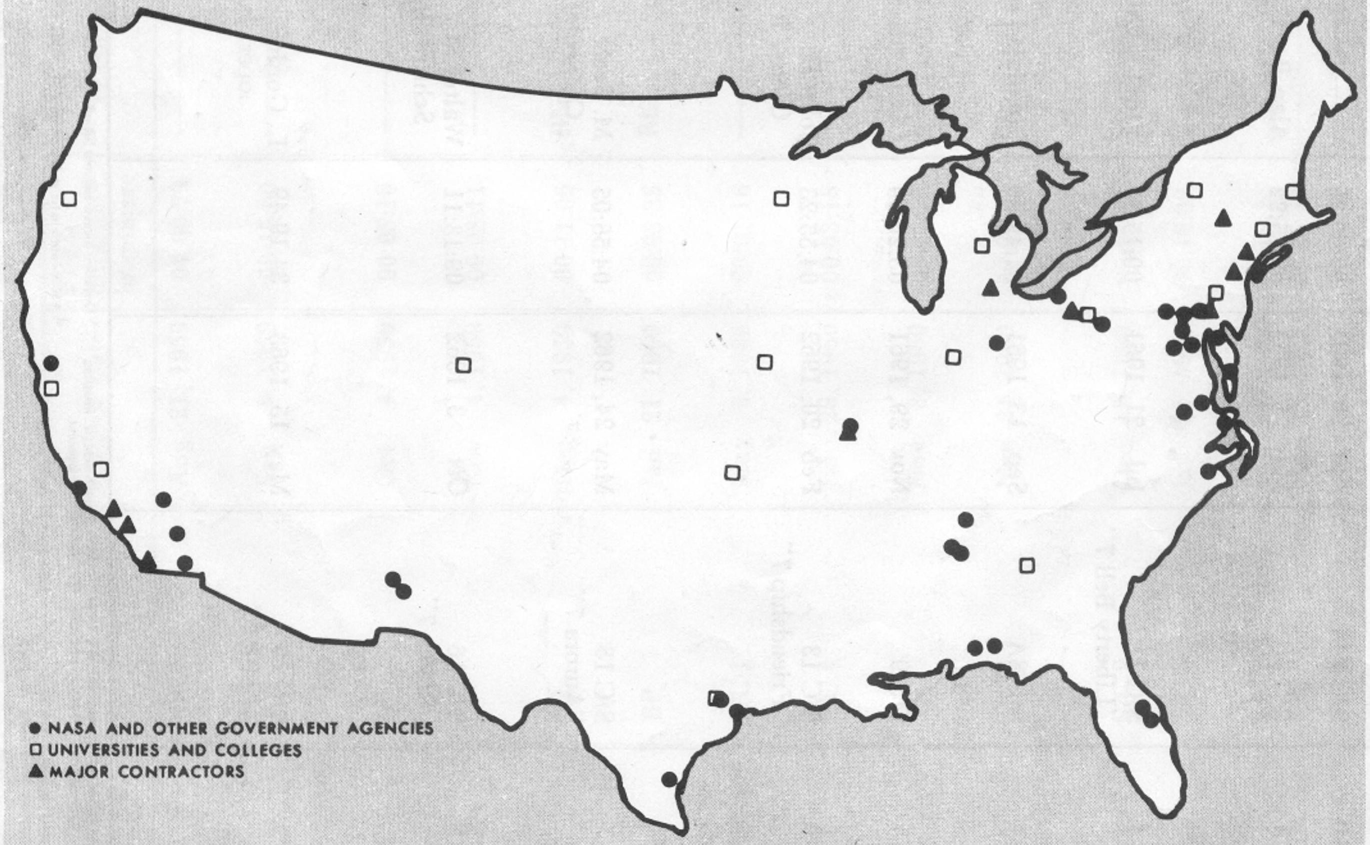
[c] Duration measured from lift-off to landing.

[d] ASCS – automatic stabilization and control systems; ECS – environmental control system.

[e] Object. – objectives of flight; prop. – propellant; T/M – telemetry.



MERCURY SPACECRAFT


● NASA AND OTHER GOVERNMENT AGENCIES
☐ UNIVERSITIES AND COLLEGES
▲ MAJOR CONTRACTORS

AGENCIES SUPPORTING MERCURY

NASA — MSC — Coml., Houston, Texas

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